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ABSTRACT

This learning module provides students with practice in applying mathematical operations to vocational agriculture. The module consists of unit objectives, definitions, information, problems to solve, worksheets suitable for various levels of vocational agriculture instruction, and answer keys for the problems and worksheets. This module provides practice in addition, subtraction, multiplication, and division of whole numbers. Practical applications in agriculture include making an inventory of assets and liabilities, keeping records, and preparing a net worth statement of a farm business. (KC)

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WHOLE NUMBERS

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TEACHING UNIT: **WHOLE NUMBERS**

TRAINING ACTIVITIES:

1. Addition of whole numbers.
2. Subtraction of whole numbers.
3. Multiplication of whole numbers.
4. Division of whole numbers.

UNIT OBJECTIVES:

1. To provide experiences which will enable students to understand the number system they use.

2. To provide experiences which will enable students to become efficient in the basic computational skills involving whole numbers.

3. To present arithmetic concepts of working with whole numbers in a manner keeping with the interests of vocational agriculture students.

DEFINITIONS:

Addition - The operation of combining two or more numbers, addends. The result of this operation is called the sum.

1	.....	addend
+2	.....	addend
3	.....	sum

Subtraction - An operation that determines the difference between two numbers. The larger number is called the minuend and the smaller number is called the subtrahend. The result of the operation is called the difference.

10	.....	minuend
- 3	.....	subtrahend
7	.....	difference

Multiplication - The operation between two numbers, the multiplicand and the multiplier, that produces a third number called a product.

2	.....	multiplicand
x 4	.....	multiplier
8	.....	product

Division - The operation of dividing one number, the dividend, by a second number, the divisor. The result of this operation is a third number called the quotient.

12	÷	2	=	6
Dividend		Divisor		Quotient

NAME _____

INSTRUCTIONS: Solve the following problems.

1. A sawmill operator cut 44,589 board feet of lumber in April, 39,517 board feet in May, and 52,672 board feet in June. How many board feet did the sawmill operator cut in the three month period?

   _____ board feet.

2. If a calf averages gaining approximately one pound of weight per eight pounds of whole milk consumed, how many pounds of whole milk must be consumed for the calf to gain 53 pounds? _____ pounds.

3. A farmer can plow seven acres of land per hour. How much longer will it take him to plow a 294 acre field than it will a 161 acre field?

   _____ hours.

4. A truck is loaded with 338 bushels of corn. If corn weighs 56 pounds per bushel, how many pounds of corn are on the truck?

   _____ pounds.

5. A gardener can spray 32 plants per minute. If she has a flower bed which measures 64 square feet and each plant occupies 16 square inches of space, how many minutes will it take her to spray the entire flower bed? _____ minutes.

NAME _____

WORKSHEET

COURSE: AGRICULTURAL PRODUCTION I

COMPETENCY : #004 - "Make an Inventory of Assets and Liabilities"

INSTRUCTIONS : Complete this financial statment.

NAME OF ITEMS	ASSETS	LIABILITIES
TOTALS: $		$
NET WORTH: $		

(*NOTE*: Net Worth = Assets - Liabilities).

1. Accounts receivable $200
2. Building mortgage 2,500
3. Cash value of life insurance 150
4. Business inventory value 10,000
5. Accounts payable 5,000
6. County and state taxes due 600
7. Cash in bank 3,000
8. Four chain saws 2,000
9. Balance owed on truck 6,000
10. Balanced owed on saws.....500
11. Fork lift (paid for).....1,200
12. Balanced owed on 4 truck tires 324
13. Wages owed workers 1,500
14. Fuel cost balance 615
15. Insurance premiums due 500
16. Ford car used in business.3000
17. 50 shares FCX stock (owned) 1,000
18. Building materials charged 1,500

NAME _____

WORKSHEET

COURSE : Agricultural Production I

COMPETENCY : #005 - "Enter income, expenses and work performed in a record book"

DATE	ITEMS OR WORK PERFORMED	EXPENSE	INCOME	TOTAL HOURS PAID	TOTAL HOURS UNPAID
TOTALS:					

INSTRUCTIONS : Place the following information in the record form above in chronological order and total each column.

	Date	Items or Work Performed	Expense or Income	Hours
A.	9-11	Purchased Hog Feed	$ 800	
B.	10-25	Purchased Feeder Pigs	$ 275	
C.	6-10	Repaired Fence	$ 0	2 hours
D.	3-18	Sold Pigs	$ 1,235	
E.	3-25	Planted Corn	$ 18	4 hours
F.	12-21	Property Taxes	$ 122	
G.	9-19	Sold Corn	$ 728	
H.	11-18	Built Shelter	$ 190	50 hours
I.	2-11	Veterinarian Bill	$ 60	
J.	12-30	Took Inventory	$ 0	3 hours

NAME _____

WORKSHEET

COURSE: **Agricultural Production III**

COMPETENCY: #012 - "Take inventory of a farm business"

INSTRUCTIONS: Complete the following farm inventory form.

FARM INVENTORY

Taken On December 31, 19___

ITEMS	QUANTITY	VALUE

TOTAL _____

1. Use the following information to complete the above farm inventory form.

   Mr. Soy Bean has two tractors valued at $24,000 each, one $39,000 combine, two grain bins valued at $6,000 each, one $2100 planter, one $1100 sprayer, 2000 bushels of soybeans worth $6 per bushel, 50 gallons of herbicide worth $68 per gallon and $500 worth of miscellaneous tools.

NAME _____

WORKSHEET

COURSE: **Agricultural Production III**

COMPETENCY: #013 - "Prepare a net worth statement of a farm business"

INSTRUCTIONS: Complete the following net worth statement using the information following the table.

NET WORTH STATEMENT AS OF _____

Property Owned

	Number	Value		Value
FIXED ASSETS			**LONG-TERM LIABILITIES**	
Land		$ _____	Mortgage on Farm Real Estate	$ _____
Farm buildings, structures, fences		$ _____	Mortgage on Other Real Estate	$ _____
TOTAL FIXED ASSETS		$ _____	**TOTAL LONG-TERM LIABILITIES**	$ _____
INTERMEDIATE ASSETS			**INTERMEDIATE LIABILITIES**	
Tractor and Power machinery		$ _____	Liens on machinery and	
Trucks		$ _____	equipment	$ _____
Brood sows		$ _____	Liens on livestock	$ _____
Market Hogs		$ _____	_____	$ _____
_____		$ _____	_____	$ _____
TOTAL INTERMEDIATE ASSETS		$ _____	**TOTAL INTERMEDIATE LIABILITIES**	$ _____

CURRENT ASSETS		CURRENT LIABILITIES	
Crops held for sale	$_____	Store bills	$_____
Feed	$_____	Accounts payable (taxes,etc)	$_____
Supplies, materials, fertilizer	$_____	Supply bills	$_____
Available cash	$_____	Gas and oil bills	$_____
Bonds	$_____	Feed bills	$_____
		Short-term debts	$_____
TOTAL CURRENT ASSETS	$_____	TOTAL CURRENT LIABILITIES	$_____

==========

TOTAL ASSETS $_____ TOTAL LIABILITIES $_____

NET WORTH (Total Assets Minus Total Liabilities) $_____

##########

January 1, 1985

Assets	Liabilities
1. 25 sows @ $350	Property taxes $2200
2. 140 Farmall tractor & equip. $4500	Feed bill $9000
3. Other machinery $52,000	Machinery lien $2100
4. Ford pickup truck $6000	Building mortgage $20,000
5. Dodge truck $4000	Land mortgage $90,000
6. 100 hogs @ 200 lbs. @ $.52/lb	Fuel bill $500
7. 400 50 lb. feeder pigs @ $1.00/lb.	Bank note $10,000
8. 5000 lbs. stored corn @ $2.80/lb.	
9. Cash on hand $1850	
10. 100 acres land $150,000	
11. Farm buildings $35,000	
12. Feed $1200	
13. Checking account $1575	

NAME _____

WORKSHEET

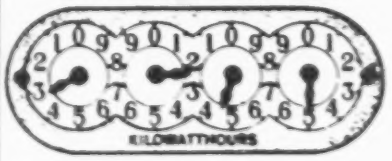
COURSE : Introduction to Agriculture and Natural Resources

COMPETENCY : #022 - "Compute problems involving the amount and cost of electric energy"

INSTRUCTIONS : Complete the following problems.

ODOMETER TYPE REGISTER

POINTER TYPE REGISTER



1. The reading on the pointer type meter is _____

2. Mr. Smith has an odometer type register on his dairy farm. The meter reading on March 1 was 5843. If the odometer reading pictured above was Mr. Smith's reading on March 31, and he pays 8.6 cents per kilowatt - hour for electricity, how much was his electric bill for the month of March?

   _____

3. If electricity cost 9.3 cents per kilowatt - hour, how much would the electricity represented by the difference in the readings of the two types of meters pictured above cost?

   _____

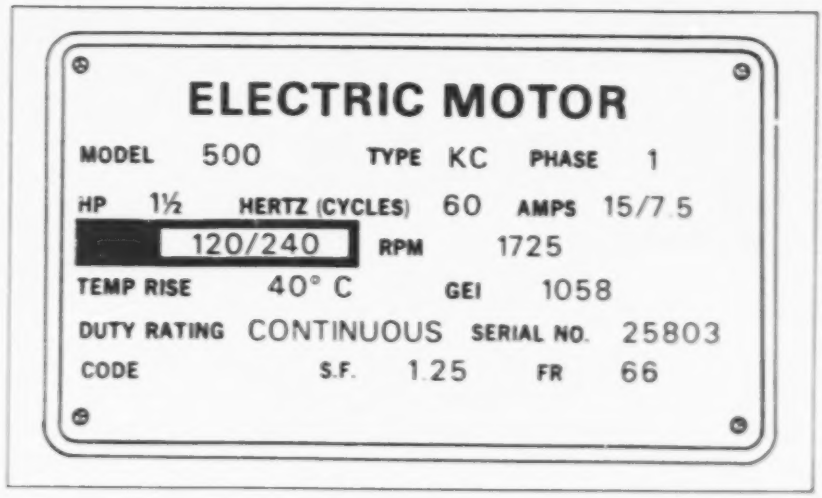
NAME _____

WORKSHEET

COURSE: Introduction to Agriculture and Natural Resources

COMPETENCY: #022 - "Compute problems involving the amount and cost of electric energy"

INSTRUCTIONS: Complete the following problems.


ELECTRIC MOTOR
MODEL 500 TYPE KC PHASE 1
HP 1½ HERTZ (CYCLES) 60 AMPS 15/7.5
120/240 RPM 1725
TEMP RISE 40° C GEI 1058
DUTY RATING CONTINUOUS SERIAL NO. 25803
CODE S.F. 1.25 FR 66

1. How many watts of electricity does the electric motor described above require when installed in a 120 volt circuit? (*NOTE*: watts = volts x amps) _____ watts.

2. If electricity costs 9.4 cents per kilowatt-hour(kw-hr), how much will it cost to operate the above motor installed in a 120 volt circuit for:
   (a) 48 hours? $ _____.
   (b) 16 hours per day for 60 days? $ _____.
   (c) 24 hours per day for 365 days? $ _____.

3. Farmer Smith has 9 electrical motors like the one described above for his grain drying system. If he has them installed in a 240 volt circuit, how much will it cost him to operate them for 14 hours a day for 33 days if he pays 9.7 cents per kilowatt - hour for electricity?
   $ _____.

Name _____

WORKSHEET

COURSE: **Agricultural Production III**

COMPETENCY: #028 - "Prepare a bill of materials for a given construction job"

INSTRUCTIONS: Using the attached project plan, solve the problems below.

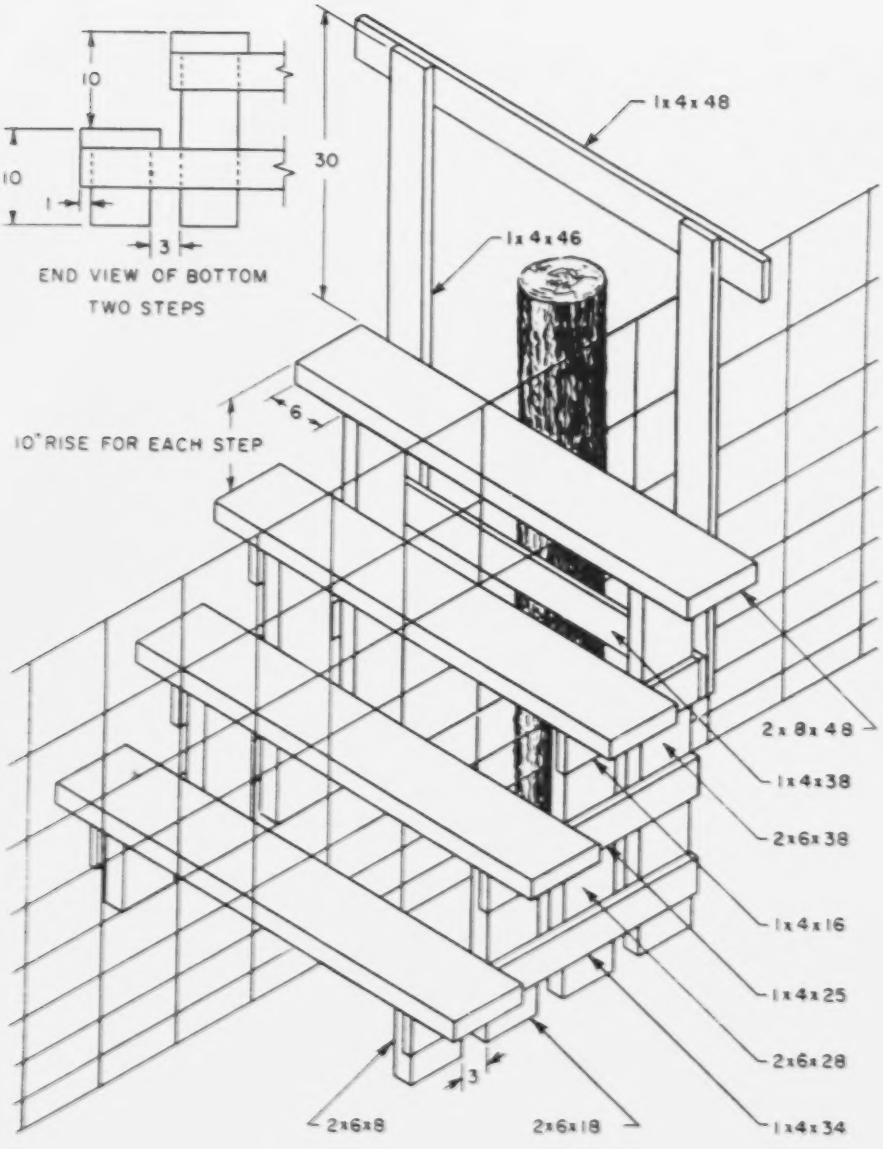
1. Assuming that the fence stile is to be constructed from unsurfaced lumber, determine:
   a. Quantity of the following needed to construct the project:

(1)	_____	2" x 8" x 48"	treads.
(2)	_____	2" x 6" x 8"	tread supports.
(3)	_____	2" x 6" x 18"	tread supports.
(4)	_____	2" x 6" x 28"	tread supports.
(5)	_____	2" x 6" x 38"	tread supports.
(6)	_____	1" x 4" x 34"	battens.
(7)	_____	1" x 4" x 25"	battens.
(8)	_____	1" x 4" x 16"	battens.
(9)	_____	1" x 4" x 38"	brace board.
(10)	_____	1" x 4" x 46"	handrail support.
(11)	_____	1" x 4" x 48"	handrail.

   b. Total pieces of the following needed to construct the project.
   (1) ____ 2" x 8" x 8' (2) ____ 2" x 6" x 8' (3) ____ 1" x 4" x 8'

2. Determine total board feet of lumber necessary to construct project.
   NOTE: (a) Board Feet = # pieces x thickness" x width" x length'/12.
   (b) Board Feet = #pieces x thickness" x width" x length'/144.
   _____ board feet.

FENCE STILE


10
10
1
3
END VIEW OF BOTTOM
TWO STEPS
30
1x4x48
1x4x46
6
10" RISE FOR EACH STEP
2x8x48
1x4x38
2x6x38
1x4x16
1x4x25
2x6x28
1x4x34
3
2x6x8
2x6x18

NAME _____

WORKSHEET

COURSE: **Agricultural Production I**

COMPETENCY: #031 - "Work up materials for stakes and batter boards"

INSTRUCTIONS: Complete the following problems.

1. From the above drawing, find the total number of eight-foot, two by fours (2" x 4" x 8') needed to make the stakes and batter boards. Each corner needs three (2" x 4" x 4') stakes, three (2" x 4" x 12") stakes, two (2" x 4" x 18") batter boards, and two (2" x 4" x 4') batter boards.

   _____.

2. Find the total board feet of wood needed to make the stakes and batter boards to square the foundation in the above drawing.

   NOTE: the formulas for caculating board feet volume are:

   (a.) Number of pieces x thickness " x width " x length ' / 12 or

   (b.) Number of pieces x thickness " x width " x length " / 144

   _____ bd. ft.

ANSWER KEY FOR MODULE TITLED "WHOLE NUMBERS"

Module Training Unit:

(1.) 135,778 (2.) 424 (3.) 19 (4.) 18,928 (5.) 18

Competency #004 Worksheet:

Name of Items	Assets	Liabilities
Accounts receivable	$ 200	
Building mortgage		$ 2,500
Cash value of life insurance	150	
Business inventory value	10,000	
Accounts payable		5,000
County and State taxes due		600
Cash in bank	3,000	
Four chain saws	2,000	
Balance owed on truck		6,000
Balance owed on saws		500
Fork lift	1,200	
Balance owed on four truck tires		324
Wages owed workers		1,500
Fuel cost balance		615
Insurance premiums due		500
Ford car used in business	3,000	
50 shares FCX stock	1,000	
Building materails charged		1,500
TOTALS:	$20,550	$19,039
NET WORTH:		$ 1,511

Competency #005 Worksheet:

Date	Items or Work Performed	Expense	Income	Total Hours Paid	Total Hours Unpaid
2-11	Veterinerian bill	$ 60			
3-18	Sold pigs		$1,235		
3-25	Planted corn	18			4
6-10	Repaired fence				2
9-11	Purchased hog feed	800			
9-19	Sold corn		728		
10-25	Purchased feeder pigs	275			
11-18	Built shelter	190			50
12-21	Property taxes	122			
12-30	Took inventory				3
	TOTALS:	$ 1,465	$1,963		59

COMPETENCY #012 WORKSHEET:

ITEMS	QUANTITY	VALUE
Tractors	2	$48,000
Combine	1	39,000
Grain Bins	2	12,000
Planter	1	2,100
Sprayer	1	1,100
Soybeans	2000 bushels	12,000
Herbicide	50 gallons	3,400
Miscellaneous Tools		500
	Total:	$ 118,100

Competency #013 Worksheet:

NET WORTH STATEMENT AS OF *(Date Completed)*

Property Owned

	Number	Value		Value
FIXED ASSETS			**LONG-TERM LIABILITIES**	
Land		$ 150,000	Mortgage on Farm Real Estate	$ 90,000
Farm buildings, structures, fences		$ 35,000	Mortgage on Other Real Estate	$ 20,000
TOTAL FIXED ASSETS		$ 185,000	TOTAL LONG-TERM LIABILITIES	$ 110,000
INTERMEDIATE ASSETS			**INTERMEDIATE LIABILITIES**	
Tractor and Power machinery		$ 56,500	Liens on machinery and	
Trucks		$ 10,000	equipment	$ 2,100
Brood sows		$ 8,750	Liens on livestock	$
Market Hogs		$ 10,400		$
Feeder Pigs		$ 20,000		$
TOTAL INTERMEDIATE ASSETS		$ 105,650	TOTAL INTERMEDIATE LIABILITIES	$ 2,100
CURRENT ASSETS			**CURRENT LIABILITIES**	
Crops held for sale		$ 14,000	Store bills	$
Feed		$ 1,200	Accounts payable (taxes,etc)	$ 2,200
Supplies, materials, fertilizer		$	Supply bills	$
Available cash		$ 3,425	Gas and oil bills	$ 500
Bonds		$	Feed bills	$ 9,000
			Short-term debts	$ 10,000
TOTAL CURRENT ASSETS		$ 18,625	TOTAL CURRENT LIABILITIES	$ 21,700
TOTAL ASSETS		$ 309,275	TOTAL LIABILITIES	$ 133,800
			NET WORTH (Total Assets Minus Total Liabilities)	$ 175,475

Competency #022 Worksheet (registers):

(1.) 3245 (2.) $29.76 (3.) $273.79

Competency #022 Worksheet (Electric Motor):

(1.) 1800 (2a.) $8.12 (2b.) $162.43 (2c.) $1482.19 (3.) $725.99

Competency #028 Worksheet:

(1a.) (1.) 4 (2.) 2 (3.) 2 (4.) 2 (5.) 2 (6.) 2 (7.) 2
(8.) 2 (9.) 1 (10.) 2 (11.) 1

(1b.)
(1.) 2 (2.) 2 (3.) 4
(2.) 48

Competency #031 Worksheet:

(1.) 13 (2.) 69.33